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| 12. ABSTRACT The Joint Working Group on Drug Dependent Degradation in Military Performance (JWGD MILPERS) program was established by the U.S. Army Medical Research and Development Command (USAMRDC) as a tri-service program charged with developing and testing performance methodologies for evaluating the effects on military performance from medical treatment and pretreatment drugs used to counter chemical warfare agents. Metters Industries, Inc. provided administrative and technical support to the JWGD including opening and operating the JWGD MILPERS Field Office, developing and maintaining program planning documents including budget and resource requirements, initiating and coordinating contract and MIPR documents on program projects, developing and maintaining microprocessor databasing systems for monitoring project and contract reports and program technology transfers, coordinating and providing administrative support for quarterly and special JWGD meetings, and participating in the development of the Performance Information Management System for archiving, retrieving and dissemination of technical and scientific information for the program. | | | |
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**Administrative and Technical Support
for the
U. S. Army Medical Research and Development Command
Joint Working Group on Medical Chemical Defense.**

FINAL REPORT

**Marvin L. Fitts, MS
Cynthia L. Kresslein**

AUGUST 1989

Supported by

**U. S. ARMY MEDICAL RESEARCH AND DEVELOPMENT COMMAND
Fort Detrick, Frederick, Maryland 21702-5012**


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FOREWORD

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1.0 INTRODUCTION

This report describes work performed by Metters Industries, Inc. in providing administrative and technical support to the Joint Working Group on Drug Dependent Degradation in Military Performance (herein referred to as the JWGD³ MILPERF).

1.1 Background

The JWGD³ MILPERF program was established by U.S. Army Medical Research and Development Command (USAMRDC), as a tri-service program with the mission of developing and testing performance assessment methodologies for evaluating the effects of medical treatment and pretreatment drugs on military performance. The program was conducted as part of the U.S. Army Chemical Defense Research Program managed by the USAMRDC and under the execution authority of the Walter Reed Army Institute of Research. The five year program has effectively developed an integrated set of methods currently described as the Performance Assessment Methodologies (PAM). The PAM includes a variety of individual performance assessment tests, batteries of tests, task analysis systems, performance modeling tools, simulator systems, and archives of human performance information and associated databases. The PAM developmental effort was managed and coordinated from the JWGD³ MILPERF Field Office under the leadership of the Director. This contract provided administrative and technical support to the developmental effort and operated the JWGD³ MILPERF Field Office.

2.0 SCOPE OF THE JWGD³ MILPERF PROGRAM

The JWGD³ MILPERF tri-service program was based on two objectives: (1) human testing of specific pretreatment chemical defense drugs; and (2) the development of a more comprehensive test battery for measurement of performance decrements among a wider variety of chemical warfare antidotes, pretreatments, prophylactic treatments and therapies. While testing with medical chemical defense drugs was a primary goal, the development and testing of performance assessment instruments had a more universal application and attracted interest outside the three services. This interest and participation in the program by the National Institute for Drug Abuse (NIDA), universities, and private industry contractors brought additional professional resources to focus on the objectives of the program. The program elements and products discussed below demonstrate the scope of the program.

2.1 Participating Laboratories

The following military service laboratories and other government laboratories were active members in the JWGD³ MILPERF program and participated in program development and planning under USAMRDC guidelines, by conducting projects, and by reviewing and making recommendations on program progress and emphasis:

Air Force

- HTL Air Force Human Training Laboratory/Operations Training Division,
 Williams Air Force Base, AZ
- AAMRL Armstrong Aerospace Medical Research Laboratory, Wright-Patterson Air
 Force Base, Dayton, OH
- SAM School of Aviation Medicine, Brooks Air Force Base, San Antonio, TX

Army

- HEL Human Effects Laboratory, U.S. Army Aberdeen Proving Grounds, Aberdeen,
 MD
- AARL U.S. Army Aeromedical Research Laboratory, FT Rucker, AL
- USARIBSS U.S. Army Research Institute of Behavioral and Social Science, Alexandria,
 VA
- USARIEM U.S. Army Research Institute of Environmental Medicine, Natick, MA
- WRAIR Walter Reed Army Institute of Research, Washington, D.C.

Navy

NAMRL U.S. Naval Aerospace Medical Research Laboratory, Pensacola, FL
NATC U.S. Naval Air Test Center, Patuxent River, MD
NBL U.S. Naval Biodynamics Laboratory, New Orleans, LA
NHRC U.S. Naval Health Research Center, San Diego, CA
NMRI U.S. Naval Medical Research Institute, Bethesda, MD

Other Federal Agencies

ARC Addiction Research Center, National Institute on Drug Abuse, Baltimore, MD
USUHS Uniformed Services University of Health Sciences, Bethesda, MD

Universities and Contractors. The following universities and industry contractors participated on a contractual basis for specific products or services:

DUKE Duke University, Department of Pharmacology, Durham, NC
GWU George Washington Univ. Department of Electrical Engineering and Computer Science, Washington, DC
DDI Decisions and Designs, Inc., McLean, VA
KII Konigsberg Instruments, Inc., Pasadena, CA
METTERS Metters Industries, Inc., Silver Spring, MD
MAD Micro Analysis and Design, Boulder, CO
UES Universal Energy Systems, Dayton, OH

2.2 Program Projects

The following projects were conducted during the course of the JWGD³MILPERF program by the laboratories and over the fiscal years indicated:

| SHORT TITLE | LAB | FISCAL YEAR | | | | | | |
|-------------|-----|-------------|----|----|----|----|----|--|
| | | 84 | 85 | 86 | 87 | 88 | 89 | |

AIR FORCE

| | | | | | | | |
|-----------------------------------|------|---|---|---|---|---|---|
| AF Admin Support | AMRL | X | X | X | | | |
| Aviation Modeling | AMRL | X | X | X | | | |
| CD Drugs and Sustained Perf | SAM | X | X | X | | | |
| CD/Perf in Aerospace Environment | SAM | X | X | X | | | |
| CD/Perf on C3 Tasks | SAM | | | | X | X | X |
| CD/Crew Flight Performance | HRL | X | X | X | X | X | X |
| Field Hardened UTCBAP I | SAM | X | X | X | | | |
| Field Perf Eval Capability | AMRL | | | | X | X | X |
| Field Vision Test Device | AMRL | X | X | X | | | |
| Flight Simulation Model | AMRL | X | X | X | | | |
| Generic Task Crewstation | SAM | X | X | X | | X | |
| Multidimensional Scaling | AMRL | X | X | X | | | |
| Panoramic Display | AMRL | X | X | X | | X | X |
| Perf Assessment System Validation | AMD | | | | | | X |
| Performance and Acceleration | SAM | X | X | X | | | |
| Performance at Altitude | SAM | X | X | X | | | |
| Physical Exercise PAB | AMRL | X | X | X | | | |
| Spatial Disorientation | SAM | X | X | X | | | |
| Task Analysis/Modeling Op Perf | AMRL | | | | X | X | X |
| Transport Aircrew Performnce | SAM | X | X | X | | | |
| UTCBAP Procedures | AMRL | X | X | X | | | |

ARMY

Project Orders

| | | | | | | | |
|----------------------------|----------|---|---|---|---|---|---|
| Mobil/Portable Test Course | HEL | X | X | X | | | |
| PAB Advanced Development | USARIBSS | X | X | X | X | X | X |

Army Command Operating Budget (COB) Projects*

| | | | | | | |
|----------------------------------|---------|---|---|---|---|---|
| Army PAB | WRAIR | X | | | | |
| CD Drug Evaluation | WRAIR | | X | X | X | |
| Helicopter Simulator Performance | AARL | X | X | X | X | X |
| Temperature Monitor | WRAIR | X | | | | |
| Thermoregulatory Response | USARIEM | X | X | X | | |

Contracts

| | | | | | | | |
|---------------------|---------|---|---|---|---|---|---|
| JWGD3 Admin Support | METTERS | X | X | X | X | X | X |
| MILPERF Models | MAD | X | X | X | X | | |

| SHORT TITLE | LAB | FISCAL YEAR | | | | | |
|-------------------------------|-------|-------------|----|----|----|----|----|
| | | 84 | 85 | 86 | 87 | 88 | 89 |
| Pattern Recognition | GWU | X | X | X | X | | |
| Screen Development | DUKE | X | X | X | X | | |
| Chem Def Users Safety System | KI | X | X | X | X | X | |
| UTCPAB Software Development | UES | | X | X | X | X | |
| Wrist Actigraph - Field | SIL | X | | | | | |
| Wrist Actigraph - Advanced | PCD | X | | | | | |
| NAVY | | | | | | | |
| Computer Standardized PAB | NBDL | X | X | X | | | |
| Field UTCPAB II | NATC | X | X | | | | |
| Generic Task Crewstation II | NATC | X | X | X | | | |
| Marine SUSOPS/Antihistamines | NHRC | X | X | X | X | X | |
| MicroSaint Applications | NAMRL | | | | X | X | |
| Navy HOS Model | NADC | X | X | | | | |
| Navy PAB/Antihist, Cold & PAM | NMRI | X | X | X | X | X | X |
| Navy Pab to Air Force | NBDL | X | | | | | |
| Navy Task/PAB Validation | NAMRL | X | X | X | X | X | X |
| DOD | | | | | | | |
| PEPAB Testing | USUHS | X | X | X | X | X | X |
| NIDA | | | | | | | |
| Level II Screen | ARC | X | X | X | X | X | |

*Army COB projects were monitored for program coordination purposes only; planning, programming and budgeting were functions of the laboratory commands.

2.3 Bibliography of JWGD³ MILPERF Program Products

A Bibliography of JWGD³ MILPERF Program Products database was developed and delivered as part of this contract effort. The bibliography includes a listing of the performance assessment instruments, simulators and situational testers, technical reports, procedural manuals, and software and hardware developed by the JWGD³ MILPERF program, and further defines the scope of the program.

3.0 SUMMARY OF WORK PERFORMED UNDER THE CONTRACT

3.1 Scope of the Contract Effort

Metters Industries, Inc. provided personnel, facilities, material and services for the operation of the JWGD³ MILPERF Field Office and performed contractual functions described in the Statement of Work. Operation of the Field Office included the general office functions of communications (electronic, telephonic, and written correspondence), equipment and material acquisition, development and maintenance JWGD³ MILPERF files and program project and contract material, and distribution of program technical and scientific reports. As the effort developed, adjustments in the operation of the Field Office were made as increased requirements for personnel and equipment were identified as outlined in the listing of contract modifications below:

3.1.1 Contract History and Modifications. The original contract period was 15 August 1984 through 14 August 1985. The contract was extended two times, which extended the contract period through 15 August 1989. Modifications over the course of the contract reflect these two extensions for the final contract period of 15 August 1984 - 14 August 1989.

| MODIFICATION NUMBER | DATE | PURPOSE |
|------------------------|----------|--|
| P50001 | 4-25-85 | Increased the amount of the contract by \$76,104 for the addition of personnel and computer equipment for a local area network. |
| P50002 | 8-13-85 | Extended the contract from 15 August 1985 through 14 August 1987, increased the negotiated amount by \$823,692, and provided incremental funding for the period 15 August 1985 through 30 November 1985. |
| P60003 | 11-20-85 | Provided incremental funding for the period 30 November 1985 through 30 October 1986. |
| P70004 | 11-1-86 | Provided incremental funding for the period 1 November 1986 through 14 August 1987. |
| P70005 | 8-14-87 | Extended the period of performance of the contract through 30 November 1987 at no additional cost to the government. |
| P80006 | 12-1-87 | Extended the period of contract performance through 14 August 1989 and provided incremental funding of \$270,000 for the period 1 December 1987 through 31 October 1988. |
| P90007 | 10-25-88 | Provided incremental funding for the period 1 November 1988 through 14 August 1989. |

3.1.2 Personnel and Positions Supported by the Contract. The contract supported two full time positions prior to Modification No. 50001 of 25 April 1985, which provided for an additional full time position. The contract supported a subcontract effort initially for computer programming support; this effort was discontinued 31 October 1986.

Personnel receiving contract support:

| Name | Position | Budgeted Hours | Actual Hours | % |
|----------------------|-------------------|-------------------|-----------------|-------|
| Marvin L. Fitts | Project Manager | 9,408 | 9,403 | 99.9 |
| Cynthia L. Kresslein | Exec Asst/Sys Mgr | 8,938 | 8,335 | 93.3 |
| * | Secretary/Admin | 8,624 | 7,374 | 85.5 |
| | Subcontractor | 7,991 | 7,991 | 100.0 |

*The Secretary/Admin position was filled by the following personnel during different periods over the course of the contract: Wanda Bynum, Marlowe Prado, Eva White and Wendy Larkins.

3.1.3 Cost Performance. The following summary provides comparative budget and cost data by cost element:

| Cost Element | Budget | Costs* | % |
|--------------|-----------|-----------|-------|
| Direct Labor | 442,105 | 427,563 | 96.7 |
| Overhead | 404,994 | 406,185 | 100.3 |
| Other Direct | 250,912 | 263,085 | 104.8 |
| Travel/Meet | 25,324 | 20,944 | 82.7 |
| Sub Contract | 264,914 | 264,914 | 100.0 |
| Gen & Admin | 217,767 | 221,199 | 101.6 |
| Fees ** | 127,075 | 108,294 | 85.2 |
| TOTAL | 1,733,091 | 1,712,184 | 98.8 |

*Costs data are based on reimbursement requests through 8-14-89.

**Fee charges withheld \$18,781

| | | |
|-----------------|---------------|-------|
| Fees reimbursed | \$108,294 | |
| Fees withheld | <u>18,781</u> | |
| | \$127,075 | 100.0 |
| Adjusted totals | \$1,730,965 | 99.8 |

3.1.4 Acquisition of Hardware/Software. Hardware and software acquisition has been based on the SOW requirements 1) to develop and maintain specialized microprocessor databasing systems for monitoring project and contract reports and research data, and 2) to develop a Performance Information Management System (PIMS) for archiving, retrieving and dissemination of technical and scientific information for the JWGD³ MILPERF program. Hardware systems were restricted to IBM compatible systems using the 8036, 80286, and 80386 series microprocessors, and software development was limited to the evaluation and employment of commercially available application packages. This development effort also involved the evaluation and testing of new approaches to the archiving, retrieval and dissemination of technical and scientific information. Appendix A lists the hardware and software acquisitions under this contract which have been transferred to the custody of Walter Reed Institute of Research.

3.2 Statement of Work Performance

The current Statement of Work (SOW), modified 1 August 1988, describes four major functional areas to be performed by this contract. Functions described evolved over the course of the contract as requirements were more clearly defined or identified. An example was the requirement to "develop the capability to demonstrate all software developed by other participants of the JWGD³ program" identified only after performance assessment systems software was developed and a decision was made to develop a centralized demonstration capability. Performance of all functions benefited from the close coordination and guidance received from the Director and Deputy Director, JWGD³ MILPERF. Databases, spreadsheets and other program documentation described in the following performance statements have been submitted to WRAIR.

3.2.1 Program Planning and Resource Acquisition Support

3.2.1.1 Program Planning Documentation. JWGD³ MILPERF program planning, directed by the USAMRDC Medical Chemical Defense Research Program through the Director, WRAIR, was performed on an annual cycle in response to procedural guidelines received from USAMRDC. The JWGD³ annual planning process generally included:

- Program review by the JWGD³ membership at quarterly meetings, which consisted of the review and evaluation of each project and contract supported by the program.
- Development of program recommendations based on decisions arrived at in the JWGD³ program review and projected funding levels provided by USAMRDC/RAD V.
- Presentation of program recommendations for the Review and Analysis of WRAIR/USAMRDC programs.
- Adjustment of program recommendations based on availability of resources as determined by USAMRDC.

The JWGD³ MILPERF Field Office developed the program planning and budget documents associated with the planning process outlined above. Program project databases and spreadsheets were developed and utilized for reports and document preparation. Program documents relating to individual projects and contracts were routinely coordinated with principal investigators and service program managers. For example, the annual Review and Analysis Document was developed in the Field Office for consistency in format and presentation, then distributed to principal investigators for editing and updating. In addition to the annual planning documentation, Metters staff participated in the preparation of planning material for quarterly and special JWGD³ meetings and for presentations by the Director to WRAIR, USAMRDC and other government offices. Documentation and materials included hardcopy and computer text and graphics, overheads and slides. Program development and coordination was a continuing process through the quarterly and special meetings and coordination with the participating laboratories on individual projects.

3.2.1.2 Contract and MIPR Documentation. After program decisions were made on individual projects and contracts, the Metters staff prepared documentation initiating funding action and submitted this documentation with JWGD³ recommendations through WRAIR to USAMRDC. Funding documents included the USAMRDC Form 9, Recommendation For Support of Research and Development Project, and DD Form 1498, Research and Technology Work Unit Summary, and both were prepared on each proposed project or contract listed in paragraph 2.2. These documents were submitted each year the contract or project was active to recommend fiscal year funding, and they were submitted as required to recommend modifications in funding, period of the project or change in project protocol, and upon completion of the project or contract. Project databases and spreadsheets were sources for program planning documents discussed above. In addition to the databases and spreadsheets, hardcopy project folders were maintained as repositories for project related documents, including the initial proposal, funding recommendations and documents, scientific and technical reports, and correspondence. In addition to initiating, coordinating, and maintaining contract and Military Interdepartmental Purchase Request (MIPR) documentation, assistance in processing requests for testing human subjects was provided in the form of tracking the request and providing liaison between the principal investigator and the USAMRDC Human Use Review Office.

3.2.2 Database Development and Technical Information Acquisition, Archiving, and Distribution. Microprocessor databasing systems were developed and maintained specifically to monitor JWGD³ project and contract reports and collect other research data and performance assessment systems developed by the program. Databasing systems described below, software, procedural manuals, and hardcopy reports have been transferred to WRAIR. Software acquisitions are listed in Appendix A.

3.2.2.1 Project Reports Database. JWGD³ MILPERF projects and contracts were required to submit quarterly, annual and final reports, as well as specific hardware, software and systems deliverables. A Project Reports Database was developed to assist in tracking reports and other deliverables which were the source for the quarterly Data Listing Report distributed, usually, at the quarterly meetings. Reports received at the JWGD³ MILPERF Field Office were entered in the database and copies were made for internal review and distribution to RAD V and other USAMRDC offices, participating laboratories, and

program principal investigators. The Data Listing Report provided a listing of reports received, reports overdue, and the next due date for active reports. The database was designed to track report status, compile, and print the status in the Data Listing Report. The input document for the database was a reporting template for recording project numbers, principal investigators, report types (quarterly, annual or final), due dates and information on reports submitted during each quarter.

3.2.2.2 Technology Transfer Database. Formal and informal dissemination of JWGD³ MILPERF program products and performance methodologies was encouraged as basic policy. The Technology Transfer Database was developed to provide a system for tracking the transfer of data and methodologies produced by the program. The database is maintained from information provided by principal investigators and program managers on the Information Dissemination or Technology Transfer Report. The database is maintained on Q&A software to facilitate queries and reports development. Procedures for operating this reporting system were developed by the JWGD³ MILPERF Field Office and distributed to principal investigators and participating laboratories. The Technology Transfer Database will be useful as a referral database, and for documenting and defining the program for headquarter level program managers.

3.2.2.3 JWGD³ Product Bibliography and Display. Deliverables and products, described in paragraph 2.3 above, submitted by participating laboratories and contractors were monitored, recorded, archived in the filing system, and included in a product display at the JWGD³ MILPERF Field Office. The Product Bibliography, created using WordStar 5 software, has been reviewed for accuracy and completeness and edited by principal investigators and program managers. The Bibliography is archived in the optical disc system, and an active Bibliography is maintained in the Nestar Local Area Network (LAN) system, both of which have been submitted to WRAIR.

3.2.2.4 Membership Database. The Membership Database was developed to house information on JWGD³ MILPERF membership, program managers, principal investigators, participating laboratories, and program contractors. The database was used to develop the JWGD³ telephone directory, distribution lists, and mailing labels. The database was maintained and changes, additions, and deletions entered as they occurred. Updated corrections to the telephone directory were mailed to the full JWGD³ distribution every six months.

3.2.2.5 Filing and Indexing System. The general JWGD³ MILPERF program filing system contained hard copy information on historical issues, JWGD³ program development and planning and budgeting documentation, project and contract progress and funding, plans and recordings of upcoming and past meetings, and general correspondence. The system also contained all articles, reports, and publications received by the JWGD³ MILPERF since 1983. The scope and size of the filing system indicated the requirement for an indexing system that would facilitate effective access to the files. ZY Index was selected as the software for indexing files due to its logical search capability and easy to learn operation. Files were color coded for easy locator identification, subject titled in ASCII text, saved, and indexed with ZY index. The indexing system provided the capability to perform logical searches on any word or set of words in the files. General and inter-departmental mail was

indexed and logged in and out which facilitated tracking mail arrival and action mail departure. At the end of the contract, lack of space on the JWGD³ LAN computer network became a problem in operating this system. To use ZY Index/Search it became necessary to download older indexes into an archive to allow the software to manipulate and index new entries. An archive for ZY Index files was established in an administrative volume; this volume held index lists that were not in everyday demand.

3.2.3 Coordination and Administrative Support for JWGD³ MILPERF Meetings.

Coordinating and providing administrative support for JWGD³ meetings was directed principally at well defined support for quarterly, Task Area Group (TAG) and special meetings. In addition, support was provided for meetings for system demonstrations (MicroSaint Modeling System; UTC-PAB Workshops; Metamorph; Taxonomic Workstation, etc.), program review and evaluation, and service representatives JWGD³ program orientations.

3.2.3.1 Appendix B is a list of JWGD³ MILPERF quarterly meetings including dates, host laboratories and locations. Coordination and support for quarterly meetings and the Program Sub-Element In-Process Review in January 1987 involved the performance of the following procedures:

- Negotiating meeting sites and insuring that meeting facility contracts provide for adequate space, audio visual equipment and supplies, and seating.
- Coordinating meeting issues with key personnel at host laboratories.
- Assembling and distributing meeting announcements, agenda and participation in the preparation of other meeting materials.
- Coordinating and scheduling accommodations for meeting participants and attendees.
- Scheduling travel (airline, rental car, hotel) for Director, Deputy Director and Metters staff attending meetings outside the Washington area.
- Setting up equipment for amplifying and recording meeting proceedings and writing the minutes of the meeting for distribution to participants, JWGD³ members, participating laboratory commanders, and official distribution.
- Supplying or arranging for the audio/visual equipment requested by the Director and other presentors.
- Attending meetings to provide on site administrative support including distribution of the information packet, attendance list sign-in, reproduction of members distributions, supplying overhead slides, general meeting supplies, and handling telephone messages, etc.

Minutes of quarterly meetings have been distributed to members and USAMRDC and WRAIR offices. The original meeting minutes were deliverables for this contract.

3.2.3.2 Metters JWGD³ MILPERF Field Office staff also participated in the planning and attended Task Area Group (TAG) meetings and Performance Assessment Battery (PAB) workshops as designated by the Director. Support for the TAG and PAB meetings was provided at varying levels from full administrative support to assistance in arranging for a

site and accommodations for participants. TAG groups and PAB workshops supported during the contract period are listed below:

TAG's:

- Level I TAG
- Level II TAG
- Level III TAG
- Modeling TAG
- Validation TAG
- Executive TAG
- Performance Physiology SubTAG
- Animal SubTAG

PAB's:

- Unified Tri-Service Cognitive Performance Assessment Battery
- Beta Testers Workshops Standards Workshops
- Performance Physiology Workshop
- Complex Cognitive Performance Battery

Assistance was provided for TAG or PAB meetings minute preparation and distribution as requested by the individual group chairman.

3.2.4 Performance Information Management System (PIMS) Development. The development of the PIMS has progressed through conceptual design, acquisition of basic hardware and software, and the development of procedures for submitting and storage of data. Development has been and will remain a continuing process.

3.2.4.1 System Design. The PIMS is designed primarily for archiving technical and scientific data produced by the JWGD³ MILPERF program in a way which will allow for varied levels of interaction between the user and the system. Current optical disk technology provides the means for storing all data sets generated in the program and related programs. It also provides the means of storing the programs that generated the data sets, research notes, reports, publications, commentaries and reviews that make the data scientifically meaningful. Data will be stored in a multiform database which is nonvolatile and massive (800 MBytes per WORM [Write-Once-Read-Many times] disk).

The PIMS has the capability to scan hardcopy documents for electronic storage as well as converting software data to formats acceptable for storage. The system will use an artificial intelligence, natural language programming system for interaction between the user and the system and a large capacity, sophisticated database management system for retrieval and dissemination of data. The PIMS will be the primary interface with the product end users which will consist of the Joint Services, civilian agencies, NATO and other allies, and Universities. When fully implemented, the PIMS will serve as the time-binding archive capable of insuring that information and knowledge generated in DOD performance assessment research is protected, distributed and exploited.

3.2.4.2 Hardware and Software Acquisition. The PIMS is designed for use on an off-the-shelf hardware/software configuration, inexpensive enough to be disseminated to units or procured by agencies having performance information requirements. Hardware and software acquisitions by this contract for the PIMS include:

SPEEDSTOR PC800 WORM Disk Drive and 800 MByte Cartridges for storage of data

Kurtzweil Discover 7320 Intelligent Scanning System for scanning hardcopy data and converting for electronic storage

REVELATION Data Base Management System

METAMORPH Ver. 2.0 Artificial Intelligence Programming and Natural Language Processing System as the interface between the user and the system for searching and retrieval of data

3.2.4.3 Further PIMS Development and Enhancement. The data archived in the PIMS will be the source of structured information for the development of performance norms and testing standards. In addition to normative data, programatic performance data from environmental, situational stress, drug, and sustained operation studies will be archived for reference. Data expansion resulting from continuous addition of new information will permit the development of norms and modules tailored to military occupational and demographic groups. Continued development will be required in the following areas to assist in the development and enhancement of the PIMS structure and in support of PIMS utilization by the military community.

Standardized formats for data input.

Monitoring system to assist in user interface and data transfer.

Monitoring system for tracking and examining data base development and utilization, and data reliability.

Develop performance norms as data availability and requirements evolve.

3.2.5. Other Functions.

3.2.5.1 Network Management. The Nestar Network System Plan 4000, acquired in May 1985, linked seven personal computers for the purpose of sharing software and data, as well as providing an interactive databasing capability and an archival storage capability. The Nestar Plan 4000 file server with 137 MByte Disk became the JWGD³ MILPERF Local Area Network (LAN) system which was managed by the Metters system manager.

3.2.5.1.1 The LAN system was organized by virtual (dedicated) volumes designated for the following functions:

DOS and other software volume
User volumes
Financial volume
Scientific volume
Administrative archive volumes
CCMail program and database volume

3.2.5.1.2 One of the seven computers was a designated full-time communications gateway. The gateway was kept active to allow the JWGD³ MILPERF members and the Director to communicate between laboratories, Task Area Groups, and the Field Office. The contract staff maintained the electronic communications database and software (CC:Mail) calling directory.

3.2.5.1.3 Maintaining the LAN required full and partial system tape back-ups on a weekly basis. The back-ups served to archive users data in the case of LAN disk failure. The LAN was also sensitive to surroundings (dust, heat) and acts of nature requiring the system manager to monitor weather and other elements and performed power-down, disconnect, or routine maintenance and cleaning as required. Major repairs or replacement of parts was provided by a maintenance agreement contract with Interlogic Trace.

3.2.5.1.4 As stated above, lack of space in the LAN memory was a problem during the last year of the effort requiring frequent system reconfiguration to allow installation of new or updated software, to permit indexing of files, or to increase size of individual and mail user volumes.

3.2.5.1.5 Nestar System Manuals were delivered to WRAIR with the Nestar Network System hardware and software.

3.2.5.2 Metters staff supplied the JWDG³ MILPERF Field Office with the accounts to gain access to the National Library of Medicine (NLM) MEDLAR Database and the BRS Database, as well as the personnel to search both databases. The search capability offered the JWGD³ MILPERF membership access to pertinent medical journals and abstracts for reference or review.

Searches performed:

- Human behavior, human performance and diphenhydramine
- Human behavior and terfenadine
- Human behavior and chlorpheniramine
- Atropine and human behavior
- Scopolimine and human behavior
- Cysyteamine and behavior in rat
- Pyridostigmine and teratogenic effects
- Physostigmine and human behavior

4.0 CONCLUSIONS

Providing administrative and technical support to the JWGD³ MILPERF program has been a professionally rewarding experience. The level and quality of the support was strongly influenced by the leadership and membership of the JWGD³. Contract performance can be evaluated, in part, on the basis of the progress and success of the program which has been significant. The program has successfully developed a set of broadly acceptable human performance assessment technologies which are basic to the PIMS. Methodologies and performance data developed by the program have the potential of contributing to the development of a standardized performance assessment system specifically directed to predicting military performance under conditions of situational and environmental stress, but which will have more universal applications. Another principal success of the program has been the establishment of a productive and efficient working relationship among a broad group of military and scientific experts directed towards the issues of performance testing generally and predicting military performance specifically. Further development of the PIMS and the standardization of the technology and measurements generated is highly recommended to take advantage of the working relationships and continue the momentum of the develop effort.

GLOSSARY

| | |
|---------------------------|--|
| JWGD ³ MILPERF | Joint Working Group on Drug Dependent Degradation in Military Performance |
| NATO | North Atlantic Treaty Organization |
| RAD V | USAMRDC Research Area Director V (Director, Medical Chemical Defense Research Program) |
| USARICD | U.S. Army Research Institute of Chemical Defense |
| USAMDDA | U.S. Army Medical Materiel Development Activity |
| USAMRDC | U.S. Army Medical Research and Development Command |
| PIMS | Performance Information Management System |
| PAM | Performance Assessment Methodologies |

PARTICIPATING LABORATORIES

Air Force

| | |
|-------|---|
| HTL | Air Force Human Training Laboratory/Operations Training Division, Williams Air Force Base, AZ |
| AAMRL | Armstrong Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base, Dayton, OH |
| SAM | School of Aviation Medicine, Brooks Air Force Base, San Antonio, TX |

Army

| | |
|----------|---|
| HEL | Human Effects Laboratory, U.S. Army Aberdeen Proving Grounds, Aberdeen, MD |
| AARL | U.S. Army Aeromedical Research Laboratory, FT Rucker, AL |
| USARIBSS | U.S. Army Research Institute of Behavioral and Social Science, Alexandria, VA |
| USARIEM | U.S. Army Research Institute of Environmental Medicine, Natick, MA |
| WRAIR | Walter Reed Army Institute of Research, Washington, D.C. |

Navy

NAMRL U.S. Naval Aerospace Medical Research Laboratory, Pensacola, FL
NATC U.S. Naval Air Test Center, Patuxent River, MD
NBL U.S. Naval Biodynamics Laboratory, New Orleans, LA
NHRC U.S. Naval Health Research Center, San Diego, CA
NMRI U.S. Naval Medical Research Institute, Bethesda, MD

Other Federal Agencies

ARC Addiction Research Center, National Institute on Drug Abuse, Baltimore, MD
USUHS Uniformed Services University of Health Sciences, Bethesda, MD

Universities/Contractors

DUKE Duke University, Department of Pharmacology, Durham, NC
GWU George Washington Univ. Department of Electrical Engineering and Computer Science, Washington, DC
DDI Decisions and Designs, Inc., McLean, VA
KII Konigsberg Instruments, Inc., Pasadena, CA
MAD Micro Analysis and Design, Boulder, CO
UES Universal Energy Systems, Dayton, OH

EQUIPMENT AND FURNITURE INVENTORY

| | | | |
|----------------------------------|-------------|--------------|------------|
| *G-286 X COMPUTER | S#2CSS10027 | GENERATION 5 | 11/30/87 |
| BTC KEY BOARD | 70502734 | " | \$1,312.50 |
| (*CONVERTED FROM CORONA 3480594) | | | |
| WITH | | | |
| NEC MULTISYNC | 79C05421J | MICROAGE | 11/30/87 |
| MONITOR | | | \$ 620.00 |

| | | | |
|---------------------------------------|--------------|-------|------------|
| *G-286X COMPUTER | S#22CSS10029 | GEN 5 | 1/30/87 |
| BTC KEYBOARD | NONE | " | \$1,312.50 |
| (*CONVERTED FROM ITT-XTRA J4Y1011395) | | | |
| WITH | | | |
| LEADING EDGE MONIOTR | 003461 | GEN 5 | (INCL) |

| | | | |
|--------------------------------------|-------------|-------|-------------|
| *G-286X COMPUTER | S#2CSS10025 | GEN 5 | 11/30/87 |
| BTC KEY BOARD | 70505210 | " | \$ 1,312.50 |
| (*CONVERTED FROM ITT-XTRA J4Y101287) | | | |
| WITH | | | |
| PRINCETON | | GEN 5 | 06/15/85 |
| MONITOR | TY12080 | | \$ 834.75 |

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|--------------------------------------|-------------|-------|-------------|
| *G-2286X COMPUTER | S#2CSS10028 | GEN 5 | 11/30/87 |
| BTC KEY BOARD | 70427158 | " | \$ 1,312.50 |
| (*CONVERTED FROM ITT-XTRA J4Y101384) | | | |
| WITH | | | |
| LEADING EDGE MONITOR | 0033249 | GEN 5 | (INCL) |

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|-----------------------|---------|-------------|-------------|
| NESTAR NETWORK SYSTEM | 5042461 | NESTAR SYS. | 05/06/85 |
| PLAN 4000 | | | \$31,644.38 |

| | | | |
|---------------------------------------|--|--|-------------|
| *HARD DISK REPLACE BY INTELOGIC TRACE | | | |
| 9/23/87 AND 10/20/87 | | | \$ 2,555.00 |

| | | | |
|---------------------|----------|-------------|-----------|
| SILVER REED PRINTER | CK78P770 | COMM. COMP. | 08/31/84 |
| EXP-70 | | | \$ 999.00 |

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|-------------------|----------|-------|-------------|
| HEWLETT-PACKARD | RST-8032 | MOORE | 06/05/85 |
| LASER JET PRINTER | | | \$ 3,102.75 |

| | | | |
|----------------------|------------|----------|-------------|
| HEWLETT-PACKARD | 2718J88293 | MICROAGE | 11/30/87 |
| LASER JET SERIES II | | | \$ 1,941.45 |
| LASER CABLE -J-10002 | | | \$ 17.33 |

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|-----------------------|--------|---------------|-----------|
| BAY TECH PRINT MASTER | 143998 | BAYTECH ASSOC | 06/03/86 |
| | | | \$ 998.30 |

| | | | |
|--|---|--------------------------------|---------------------------|
| NEC MULTISYNC MONITOR | 79C04603J GR SESSIONS | MICROAGE | 11/30/87 \$ 620.00 |
| LEADING EDGE MONITOR | 001438 | GEN 5 INCL P/C UPGRADE | |
| CORONA MONITOR | 3480594 | " " | 11/30/87 |
| WORM OPTICAL DISK DRIVE PC800E(SDN01063) GEN 5 STORAGE DIMENSIONS | | | 10/22/87 \$ 4,194.95 |
| KURZWEIL DISCOVER SCAN MODEL 7320 | 7100026 | KURZWEIL | 01/21/88 \$12,571.17 |
| PROMODEM 2400 | NONE | GEN 5 | 05/16/89 \$ 204.75 |
| TRILLIUM PANTHER TELEPHONES | LEASE/PURCHASE \$1.00 BUY OUT AFTER 24 MONTHS | PUBLIC PHONE STORE (BUTLER) | 10/29/87 \$ 111.30 MO. |
| STEREO CASS. RECORDER SANYO MODEL RD-R-60 | 03424874 | MIKTONICS | 09/27/85 \$ 210.00 |
| EDCOR MIXER MX-20 | 15005 | MICTRONICS | 09/27/85 \$ 519.00 |
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| E.V. 25 FT MIKE CABLES (8) | | MIKTRONICS | 09/27/85 \$ 218.00 |
| ATLAS TABLE MIKE STANDS (8) | | MIKTRONICS | 09/27/85 \$ 107.52 |
| IBM SEL. TYPEWRITER | 542-4052 | MOORE | 07/09/84 \$ 975.45 |
| PANASONIC COPIER FP1540 | 11595 | COMMONWEALTH | 4/88 (24 MONTH) |
| <u>FURNITURE PURCHASED:</u> | | | |
| WORK STATION | 0251 HON | HELP, INC | 12/19/84 \$ 225.00 |

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| WORK STATION | 721 | COMPUTER SUP. | 10/04/84 \$ 204.90 |
| WORK STATION | HN60251L | HELP, INC | 06/26/85 \$ 471.45 |
| WORK STATION | 60261 HON | HELP, INC | 12/19/84 \$ 250.00 |
| WORK STATION | HN-60271-HL HN-60214-LHL | HELP, INC. | 09/15/85 \$ 535.00 |
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| WHITE BOARD S754 | | OFFICE BOY | 09/09/84 \$ 38.00 |
| PORCELAIN BOARD | | HELP, INC | 09/15/85 \$ 250.00 |
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| LETTER SIZE FOUR DRAWER (1) | | LEFT BY LAST RENTERS OF 10 P.O. ROAD | |
| TWO DRAWER LEGAL FILE FILE CABINET | MS200012F84 | CORT FURN | 08/22/84 *\$ 17.00 |
| EXECUTIVE CHAIR | C76120C85 | CORT FURN | 09/02/87 *\$ 17.50 |
| STACKING CHAIRS (10) | M10208C-84 | CORT FURN | 08/22/84 *\$ 3.50EA |
| VISITORS CHAIRS (7) | C11308C84 | CORT FURN | 08/22/84 *\$ 9.50EA |

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| SECRETARY CHAIR | C-3802-C-84 | CORT FURN | *\$ 08/22/84 9.5CEA |
| EXECUTIVE CHAIR | C-76123C84 | CORT FURN | *\$ 05/10/85 17.50 |
| EXECUTIVE CHAIR | C40028C-84 | CORT FURN | *\$ 08/22/84 14.00 |
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| CREDENZA | M1960682 | CORT FURN | *\$ 08/22/84 20.00 |
| CONFERENCE TABLE | M96300TW9 | CORT FURN | *\$ 08/22/84 12.00 |
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| SECRETARY DESK UNIT | M12100G84 | CORT FURN | *\$ 08/22/84 24.00 |
| EXECUTIVE DESK | M12100084 | CORT FURN | *\$ 08/22/84 20.00 |
| WORK STATION | 3330360787 | CORT FURN | 09/02/87 |
| W/WORK TABLE | 3304080787 | CORT FURN | *\$ 26.00 |

* MONTHLY LEASE/BUY PAYMENTS

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| SYSTEM RESEARCH LABORATORY | 1- METTERS SILVER SPRING | NOV. 1987 |
| LABPAC BOARD | 1-DAVE THONE WRAIR 189 | \$3,060.00 |
| SRL MODULUS III BUTTON BAY | 1- METTERS SILVER SPRING | NOV 1987 |
| " | 1- DAVE THONE WRAIR 189 | \$2,900.00 |
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SOFTWARE ARCHIVE JWGD3 MILPERF

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| 01/24/86 | REFLEX #26140 | GENERATION 5 | \$ 89.25 |
| 04/10/86 | IBM PC SCRIPT | FREDERICK COMPUTERS | \$ 31.50 |
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| 08/13/86 | CCMAIL FOR MODEMS SERIAL #1001010131 | PCC SYSTEMS | \$ 307.00 |
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| 11/14/86 | GRAPHER UPDATE SERIAL 3143 VER 1.0 G-0001-3143 VER 1.0 01-0110-2513 VER 1.2 01-0110-2701 VER 1.2 G-0001-2966 VER 2.0 | GOLDEN SOFTWARE | \$ 35.00 |
| 03/15/88 | GRAPHER UPDATE 3.11 #G-0110 | GOLDEN SOFTWARE | \$ 35.00 |
| 03/10/87 | SURFER SERIAL #4138 | GOLDEN SOFTWARE | \$ 103.00 |
| 03/30/87 | PC SORITEC 6.3 ECONOMETRIC SERIAL #101318 | SORITES GROUP, INC. | \$ 595.00 |
| 04/13/87 | MATH CAD 1.1 | MATH SOFT, INC | \$ 255.35 |
| 01/27/89 | MATH CAD UPDATE 2.0: STATISTICS I AND STATISTICS II | | \$ 210.50 |
| 04/20/87 | TURBO HALD GRAPHICS | SOFTWARE STORE | \$ 136.45 |
| 05/21/87 | NORTON ADV UTIL. | GENERATION 5 | \$ 158.00 |

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| 05/11/87 | READY! RESIDENT OUTLINE PROCESSOR #SI-LVT 10275012 | FREDERICK COMPUTERS | \$ 68.25 |
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| 06/04/87 | WORDSTAR 4 #7133 | MICROPRO INTERNATIONAL | \$ 94.00 |
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| 10/20/87 | METAMORPH 2.1 #1692717-5 | THUNDERSTONE | \$6,974.10 |
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| 01/06/88 | DISCOVER 2.0 SCANNER KURZWEIL # 31PO4377-01 #31P04377-04 # 31PO4377-02 #31P04374 # 31PO4377-00 # 31PO4378-00 # 31PO4377-03 | INCL IN SCANNER PRICE. |
| 08/23/88 | DISCOVER 3.0 SCANNER KURZWEIL UPDATE OPTICAL DISK INTERFACE SOFTWARE 2.03 #S8001P | \$ 414.75 |
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| 2/19/88 | KNOWLEDGE MAKER | \$ 104.00 |
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| 08/29/88 | KNOWLEDGE PRO GRAPHICS TOOLKIT | |
| 88 | MICROSOFT MOUSE (DELIVERED WITH TRACKBALL) #S-217/000099.503 | \$ 125.00 |
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| | SCI MATE VER 1.2 INST. SCI. INFOR. #PMD-1 | FWH |
| | SIRE KRM, INC. | FWH |
| 01/07/88 | SOFTWARE GARDEN DEMO UTILITIES #1011-1-C | \$ 25.00 |
| 02/09/88 | SOFTWARE GARDEN DEMO II UPDGRADE | \$ 58.50 |
| 03/01/88 | HIJAAK VER 1.03 #12461 | \$ 96.00 |
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| 10/27/88 | COMPANION WORD FOR WORD DESIGN SOFTWARE #WP 3455 | \$.00 |
| 10/31/88 | PERSONAL REXX VER 1.0b MANSFIELD #203673 | \$ 128.00 |
| 11/22/88 | MYBASE DATABASE #2619 | \$ 64.99 |
| 11/22/88 | LOGIC MOUSE AND SOFTWARE #MDX618532-F2 | \$ 94.99 |
| 03/17/89 | PERSONAL REXX UPDATE VER 2.0 #PN 2003-AU | \$ 27.00 |
| 11/02/88 | DEASE IV ASTON-TATE #0911184-24 | \$ 192.30 |
| 11/18/88 | QUICK BASIC OR LATTICE 3 MATRIX LAYOUT # MLY 00006786 | \$ 149.95 |
| 89 | MATRIX DESKTOP LAYOUT #MLY 00006786 | \$.00 |
| 11/22/88 | MY BASE QUICK REFERENCE #2619 | \$ 64.99 |
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| 7/7/89 | WINDOWS/286 VER 2.11 EGGHEAD #444745 | \$ 79.99 |
| 7/7/89 | DESIGNER VER 2.0 EGGHEAD #531590 | \$ 519.00 |
| 7/7/89 | PROFESSIONAL HYPERTEXT SYSTEM VER 2.0 SN #42703320 | \$ 137.54 |
| 7/18/89 | ZY INDEX PLUS VER 3.0 # 116617 | \$ 695.00 |
| 05/10/89 | SYSTAT UPGRADE 4.0 # 003455 | \$ 815.00 |

SOFTWARE PURCHASED BY METTERS SUBCONTRACTOR 84-01 E.G.&G. WASC.

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| SAVVY PC | SERIAL #40322706 | \$ 395.00 |
| SYSTAT | SERIAL #003455 | \$ 495.00 |
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| REBASE 5000 | SERIAL #510-1006059 | \$ 439.00 |
| REBASE 5000 MULTIPLE USER UPGRADE | SERIAL # 517-20001035 | \$ 680.00 |
| 04/14/86 | GRAPHER GRAPHICS - GOLDEN SOFTWARE | \$ 413.00 |

CONTRACTOR SUPPORTED JWGD³ MILPERF QUARTERLY MEETINGS

| <u>DATE</u> | <u>HOST LABORATORY</u> | <u>CITY</u> |
|--------------|---|-------------------|
| 10 Oct 84 | WRAIR/JWGD ³ MILPERF | Silver Spring, MD |
| 10 Jan 85 | WRAIR/JWGD ³ MILPERF | Silver Spring, MD |
| 03 Apr 85 | SAM, Brooks AFB | San Antonio, TX |
| 25 Jul 85 | Naval Health Research Center | San Diego, CA |
| 17 Oct 85 | WRAIR/JWGD ³ MILPERF | Annapolis, MD |
| 15-17 Jan 86 | USAMRDC, RAD V (Program Sub-Element In Process Review) | Frederick, MD |
| 07 May 86 | SAM, Brooks AFB | San Antonio, TX |
| 08 Oct 86 | Addiction Research Ctr, NIDA | Baltimore, MD |
| 21 Jan 87 | NAMRL | Pensacola, FL |
| 29 Apr 87 | AAMRL, Wright Patterson AFB | Dayton, OH |
| 08 Jul 87 | WRAIR/JWGD ³ MILPERF | Silver Spring, MD |
| 04 Nov 87 | WRAIR/JWGD ³ MILPERF | Calverton MD |
| 15 Feb 88 | SAM, Brooks AFB | San Antonio, TX |
| 19-20 Oct 88 | WRAIR/JWGD ³ MILPERF | Calverton, MD |
| 25 Jan 89 | NHRC | San Diego, CA |
| 12 Apr 89 | AAMRL, Wright Patterson AFB | Dayton, OH |
| 26 Jul 89 | WRAIR/JWGD ³ MILPERF | Calverton, MD |

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